This document contains the Comprehensive Conservation and Management Plan for Narragansett Bay, December 1992: Source Control: Combined Sewer Overflows, and Source Control: On-Site Sewage Disposal Systems.

*The report (*narragansett_ccmp_pt6.pdf*) can be downloaded from:*

http://www.epa.gov/owow/estuaries/ccmp/documents/narragansettbay.html

File 6 of 7

December 1992

04-01-04 Source Control: Combined Sewer Overflows

Objective for the Abatement of Combined Sewer Overflows

Combined sewer overflows within the State of Rhode Island and the Commonwealth of Massachusetts shall be eliminated or brought into compliance by the year 2000 with technology-based requirements and applicable state water quality standards, in order to preserve and restore existing and historical uses wherever possible.

Introduction

In many older communities, wastewater and storm runoff is collected, conveyed, and discharged by a single system, the combined sewer. During periods of precipitation or snow melt, the combined flows of wastewater and runoff may exceed the carrying and treatment capacities of the conveyance system and the associated wastewater treatment facility (WWTF). At these times, hydraulic overload of the facility or flooding is prevented by combined sewer overflows (CSOs), which divert excess flows from the combined sewer directly to a receiving water (Zingarelli and Karp, 1990:i). A combined sewer system is described schematically in Figure 715-04(2).

Statement of the Problem

Combined sewer overflows and WWTF bypasses are the greatest source of fecal contamination to the receiving waters of Narragansett Bay (Zingarelli and Karp, 1990:9). Discharges from CSOs also release untreated, or partially treated, industrial process wastewater. In general, the flow of untreated sewage, industrial wastewater, and urban runoff from CSOs can contribute to violations in water quality criteria for turbidity, dissolved oxygen, bacteria, metals, and toxic organic pollutants. These discharges also may contribute to low oxygen conditions in some areas due to high levels of nutrients and solids loadings. While some CSO impacts, particularly those relating to turbidity or dissolved oxygen, tend to be localized around the outfall, others, such as fecal contamination, may be significantly more widespread (Zingarelli and Karp, 1990).

Discharges from CSOs and WWTF bypasses into Narragansett Bay's receiving waters have contributed to the permanent closure of 26,000 acres of shellfish harvesting areas in Mount Hope Bay and the Providence River, and, following precipitation events, result in the closure of an additional 10,672 acres in the upper bay (Zingarelli and Karp, 1990:8-9). Closures in conditional harvesting areas run for a minimum of seven days after the storm. These periods, added together over the course of a year, can represent a significant amount of time. In 1990, for example, CSO-related harvesting prohibitions in the conditional area spanned 281 days.

Leaks and hardware failure in combined sewers can cause discharges to receiving waters even in dry weather. Additionally, wherever the structural integrity of the drainage system is compromised, significant volumes of groundwater may be able to infiltrate. This can cause dry weather overflows and increased overflows during storms. Physical blockages of the regulating structures can also result in overflows in both dry and wet weather (Zingarelli and Karp, 1990:1).

More than a hundred CSOs and WWTF bypasses discharge directly into Narragansett Bay or its tributaries. Their locations are indicated in Figure 715-04(3). The annual discharge to the Bay from these facilities is estimated to be four billion gallons—compared to 73 billion gallons per year from the WWTFs themselves (Zingarelli and Karp, 1990:2).

Existing Policies

Combined sewer overflows are "point sources" (of water pollution) regulated through the National Pollutant Discharge Elimination System (NPDES). In Rhode Island, CSOs are subject to Rhode Island Pollutant Discharge Elimination System (RIPDES) permits. [See 04-01-01 Source Reduction: Toxics.] In Massachusetts, the U.S. Environmental Protection Agency

Figure 715-04(2): Schematic of CSO System.

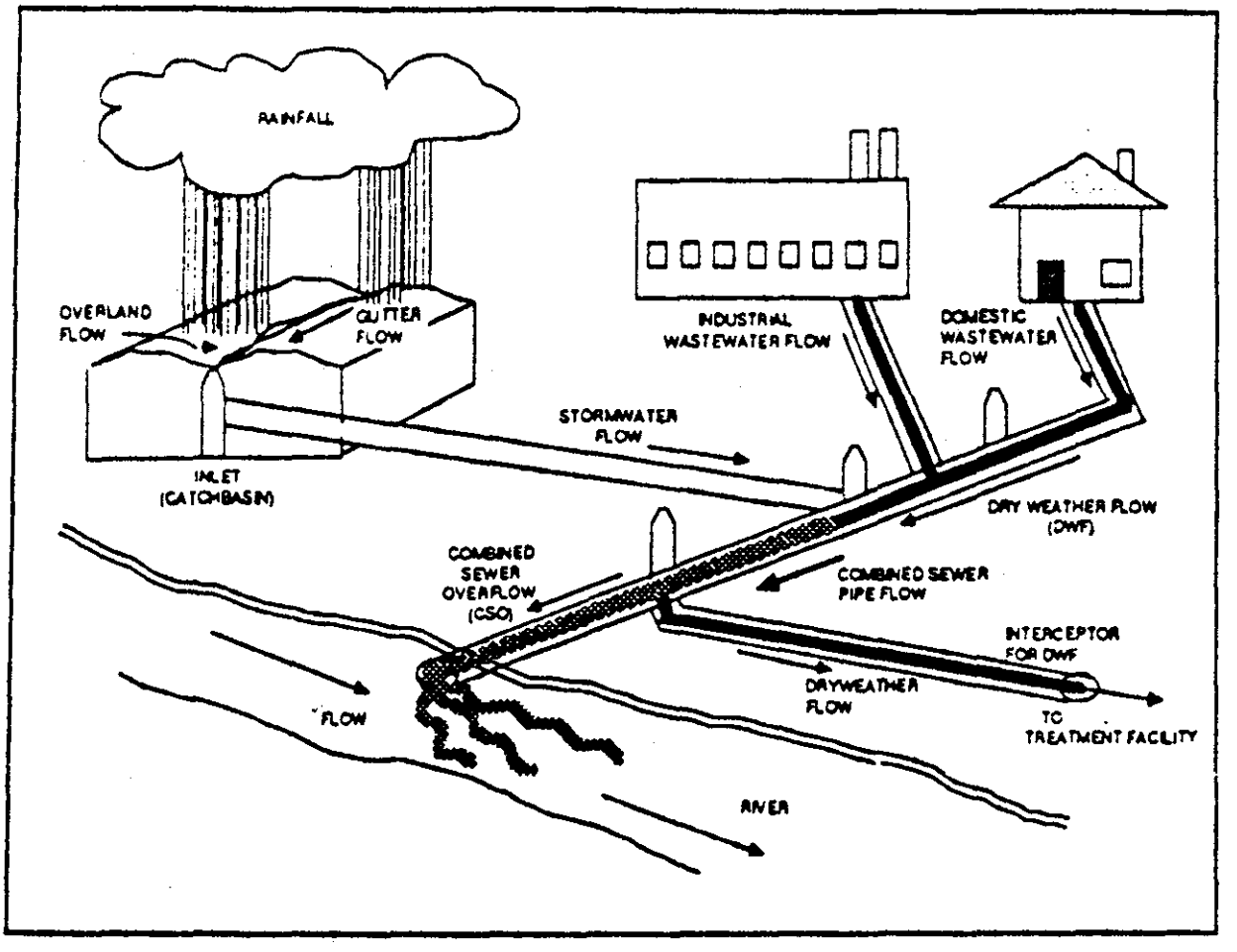
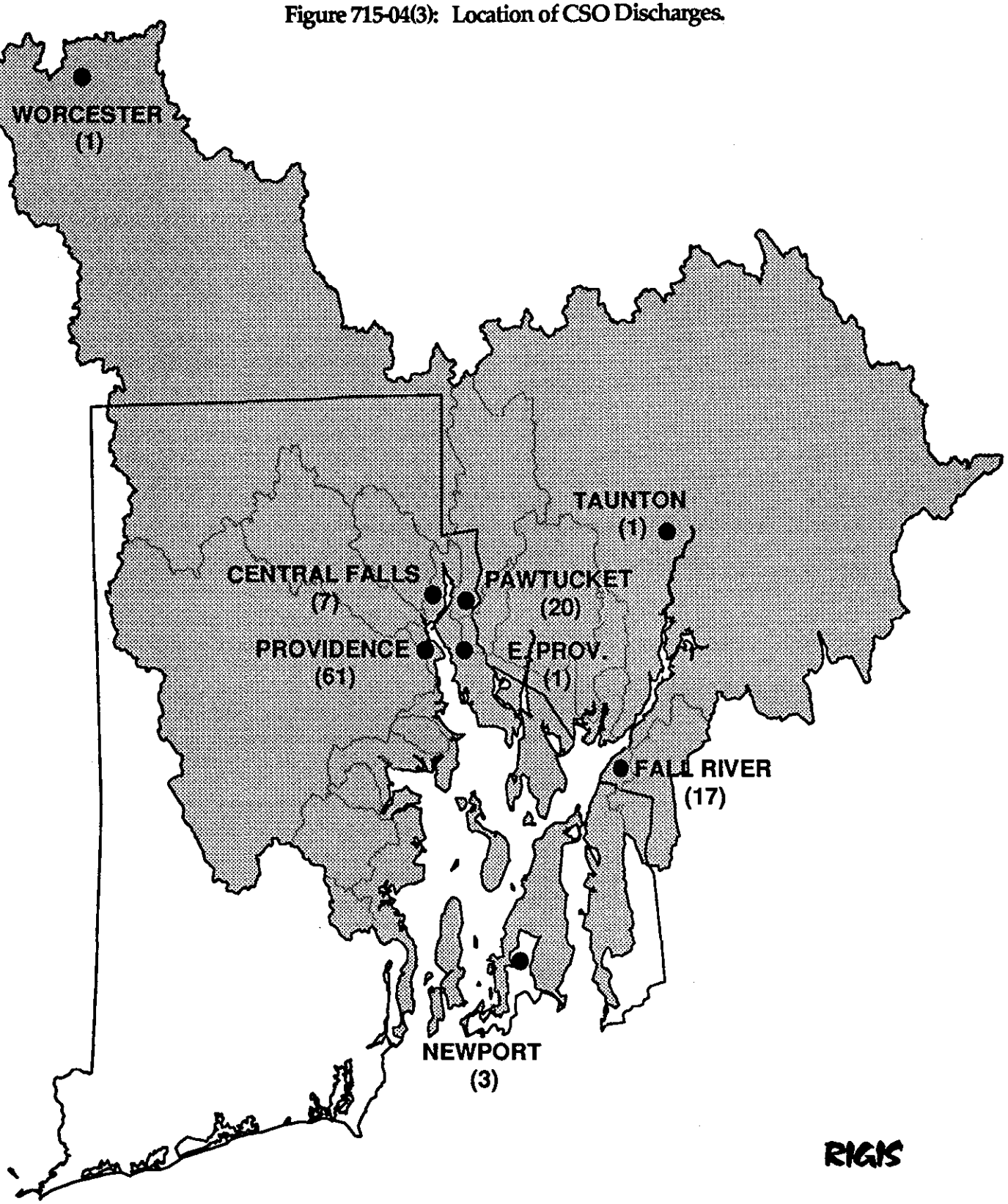


Figure 715-04(3): Location of CSO Discharges.



(EPA) Region I has retained this authority under National Pollutant Discharge Elimination System (NPDES).

The EPA formulated a *National Combined Sewer Overflow Control Strategy* in 1989. The *Strategy* is "designed to complement the control programs for sanitary sewers and separate storm sewers. [It] establishes a uniform, nationally-consistent approach to developing and issuing NPDES permits for CSOs...State-wide permitting strategies will be developed by the States or Regions to ensure implementation with this CSO strategy." (EPA, 1989a:1,3) As a minimum, the *Strategy* proposes that states and municipalities employ technology-based measures to meet the goals of the Clean Water Act. Included among these methods are regular maintenance, effective pretreatment programs, maximization of flow to WWTFs, a prohibition of dry weather overflows, and control of fecal, solid, and floatable materials in wet weather overflows. In addition, "the CWA under Section 301(b)(1)(C) also requires any additional permit limits that may be necessary to protect State water quality standards" (EPA, 1989a:6).

In response to EPA's *National Strategy*, the Rhode Island Department of Environmental Management (RIDEM) prepared a *Combined Sewer Overflow Policy* that was approved by the EPA in April 1990. This policy requires that each CSO discharge receive *equivalent primary treatment*—"the use of or combined uses of storage, screening, settling, or other technologies such that the treated effluent results in removal rates of 50% of the Total Suspended Solids (TSS) and 35% of the Biochemical Oxygen Demand (BOD) loadings[,] or 100% of all settleable solids, whichever is demonstrated to have the greatest water quality impact" (RIDEM/Division of Water Resources (DWR), 1990b:n.p.). All flows created by the hypothetical one-year, six-hour design storm, and storms occurring more frequently, are subject to the requirement of equivalent primary treatment (Zingarelli and Karp, 1990:4). If equivalent primary treatment cannot sufficiently abate water quality impacts from a particular CSO, RIDEM reserves the right to require more extensive treatment (RIDEM/DWR, 1990b).

As opposed to establishing specific removal rates for components of CSO discharges, Massachusetts' *Implementation Policy for the Abatement of Pollution from Combined Sewer Overflows* requires the outright elimination of impacts on receiving waters. Impact elimination is determined by the nondegradation of the receiving water's designated use. This use classification, assigned according to the Commonwealth's Water Quality Standards, must be maintained for storms up to the hypothetical three-month storm, a design storm of such intensity that it is expected to occur or to be exceeded once every three months. If overflows cannot be eliminated, relocated, or otherwise sufficiently mitigated, the receiving water may be assigned a "partial-use" subcategory to denote occasional short-term impairment of use (Commonwealth of Massachusetts, 1990a:n.p.; Zingarelli and Karp, 1990:5).

Analysis

State Policies

The policy approaches taken by state government in Rhode Island and Massachusetts with regard to the CSO problem are dissimilar, though both are sanctioned by the EPA. In Rhode Island, there is a specific technology-based requirement for abatement: effective primary treatment for storm events up to the one-year, six-hour design storm. In Massachusetts, the standard is maintenance of use categories in affected waterbodies, for events up to the three-month design storm. Massachusetts has no technology-based requirement *per se*.

Both CSO policies are very new, and to date there have not been any abatement projects constructed since their implementation that test either one. The EPA has left it up to the individual states to establish their own policies and procedures for maintaining water quality standards, and no major inequities have yet been reported due to the difference in approaches. However, it is possible that the fundamental difference in policies (*e.g.*, the different design storms) will result in fundamentally different abatement projects and water quality benefits in Rhode Island and Massachusetts. It is also quite possible that

the different policies eventually will cause problems in shared waters such as Mount Hope Bay. For example, planned abatement facilities for Fall River, which will be designed under Massachusetts' CSO policy, could be insufficient to meet Rhode Island's goals for its portion of Mount Hope Bay (Zingarelli and Karp, 1990:14).

Rhode Island's CSO policy allows a CSO authority to petition the RIDEM for relief from the requirement of effective primary treatment should "significant beneficial water quality improvements" be demonstrated using a cost-benefit analysis from incorporating a lesser level of treatment. No provisions are included in the policy, however, outlining the specific actions that the authority must undertake to petition for relief.

Abatement Strategies

There are three basic types of structural abatement measures. The first is separation of combined sewer flows into independent sanitary and storm flows, followed by full (usually secondary) treatment of sanitary flows. The second is storage of overflows in detention systems at centralized locations or at individual overflow points, and subsequent discharge to WWTFs when treatment capacity is available. The third is treatment of the overflows, also at either centralized or localized sites, by such measures as screening and sedimentation, coagulation-flocculation, or swirl concentration-vortex separation, plus disinfection (typically chlorination or chlorination/ dechlorination) (Zingarelli and Karp, 1990:10-11).

Non-structural measures, or "best management practices" (BMPs), may also be used, either as stand-alone strategies or in conjunction with structural measures to reduce the scale of structural improvements. Some basic BMPs are street sweeping, controlling erosion at construction sites, eliminating infiltration and inflow, flushing sewers to remove trapped solids, and increasing network storage (Zingarelli and Karp, 1990:10-11).

Progress on the Local Level

Local authorities in the Narragansett Bay watershed have completed several CSO abatement projects:

- The City of Worcester constructed a CSO facility that stores, screens, and (in summer months only) disinfects discharges, with engineered capabilities up to the five-year storm. The facility officially went on line on December 8, 1990, the effective date of its NPDES permit.

- Newport completed its CSO treatment and disinfection facility on Washington Street in March 1991, and renovated and modified a microstrainer facility on Wellington Street that had experienced operational problems.

- After implementing the first phase of its local abatement plan, Fall River is reported as having virtually eliminated illegal dry-weather discharges to the Quequechan River from the city's CSOs.

- The Narragansett Bay Commission (NBC) has constructed several improvements to its system to provide in-line storage and divert combined sewage flows to the Field's Point WWTF (Zingarelli and Karp, 1990:12).

Several more projects have been proposed and tentatively scheduled for completion within the next ten years:

- Fall River's storage and treatment follow-up is expected to be completed by the year 2000, at a cost of $122.4 million (Maguire Group, 1990).

- The NBC will conduct a program of repairs and renovations, storage and treatment facilities, and sewer separation, for its Field's

Point service area. The total cost is estimated at almost $200 million (Narragansett Bay Commission, 1991).

- The Blackstone Valley District Commission (BVDC) on behalf of the cities of Pawtucket and Central Falls began a CSO abatement study for the Blackstone and Seekonk Rivers in November 1990. The study, being completed by the NBC as a result of its merger with BVDC, has issued a draft report recommending CSO abatement facilities estimated to cost approximately $117 million (Beta Engineering and CH2M Hill, 1992).

Recommended Policies and Actions and *Estimated Cost of Implementation* are presented in the following pages.

RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: COMBINED SEWER OVERFLOWS

CODE	POLICY	AGENCIES	STATUS
I.	CSO Abatement Policies		
I.A.	The EPA should carefully review and monitor the implementation of state CSO policies to ensure that states are consistently and equitably moving toward compliance with water quality standards.	EPA	[See EPA. Region I "Preliminary Agreement," Section 715-05-06.]
I.A.1.	The EPA should review relevant federal and state CSO policies every three years, concurrent with the review of state water quality standards, with subsequent review as needed, to ensure that the policies, as applied, are adequate to ensure compliance with state water quality standards. The Narragansett Bay Project should convene a forum of representatives from the EPA, State of Rhode Island, and Commonwealth of Massachusetts to develop a written statement of agreement on the goals, interpretation, and implementation of these policies.	EPA, NBP, RIDEM, MADEP	
I.A.2.	Efforts should be taken to reconcile the water quality classifications of interstate waters, such as Mount Hope Bay and the Blackstone River.	EPA, RIDEM, MADEP	[See RIDEM "Preliminary Agreement," Section 715-05-06; 04-03-01 Areas of Special Concern: Mount Hope Bay; and 04-03-02 Blackstone River.]
I.A.3.	The EPA and the states should ensure that receiving water monitoring is conducted within a defined area of all CSO discharge zones, in order to assess the ultimate success of CSO abatement projects in achieving water quality standards.	EPA, RIDEM, MADEP	[See EPA Region I "Preliminary Agreement," Section 715-05-06.]

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: COMBINED SEWER OVERFLOWS

CODE	POLICY	AGENCIES	STATUS
I.A.4.	The EPA should carefully review NPDES/RIPDES permits issued to CSO dischargers, to ensure that: a. The permits are in compliance with all applicable CSO policies (federal, regional, and state). b. The permits are sufficiently stringent to attain designated uses of receiving waters. c. Appropriate state or local authorities monitor receiving waters to evaluate the success of CSO abatement in meeting water quality standards. Permits that affect interstate waters should be reviewed by both states to ensure consistency with water quality standards in both states. d. Particular attention should be paid to the water quality impacts of the Narragansett Bay Commission (NBC) Bucklin Point North Diversion Structure. EPA and RIDEM should review the NBC CSO abatement study to ensure that the projects recommended are consistent with the state CSO policy and, based on the data in that study, make CSO abatement at the North Diversion Structure a high priority (see Recommendation III.A.). An effluent (Recommendation I.E.) and receiving water quality (Recommendation I.A.3.) monitoring program should be established to determine if the level of CSO abatement provided by the project is sufficient to meet water quality standards. EPA, RIDEM, and NBC should subsequently review the results of the monitoring program to determine whether greater than primary treatment should be required for all flows from the North Diversion Structure to achieve the State's goals for CSO abatement.	EPA, RIDEM, NBC	See Recomm. I.A.3., I.E., III.A. EPA currently issues or reviews all NPDES and RIPDES permits issued to CSO dischargers.
I.B.	The RIDEM CSO policy should be revised, as quickly as possible, to incorporate a stronger water quality-based approach, in addition to the current technology-based approach, to CSO abatement, noting that: 1. Revisions to the RIDEM CSO policy should not be interpreted to delay CSO abatement projects undertaken by publicly owned wastewater treatment facilities (WWTFs) under current policy [See Recommendation I.C.]. 2. Water quality-based permits are predicated on water quality-based criteria that may now vary in neighboring states with shared waterbodies.	RIDEM	[See RIDEM "Preliminary Agreement," Section 715-05-06.]
I.C.	CSO abatement plans developed before the approval of revised state CSO policies should be subject to all requirements of those policies. Those WWTFs currently implementing CSO abatement plans based on current policies in "good faith" should continue to implement those plans.	EPA, RIDEM, MADEP, CSO authorities	[See EPA Region I "Preliminary Agreement," Section 715-05-06.]

✓ - **High Priority Action**

RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: COMBINED SEWER OVERFLOWS

CODE	POLICY	AGENCIES	STATUS
I.D.	A documented waiver process, open to public review, should be established for requesting a waiver from the RIDEM's technology-based CSO requirement of effective primary treatment for storms up to the one-year, six-hour design storm, noting that the specific requirements for a waiver can only be determined on a case-by-case basis.	RIDEM	
I.E.	A program of CSO discharge monitoring should be established, through NPDES/RIPDES discharge permits, that includes monitoring of selected outfalls. The respective states should cooperate with the implementing authority in developing the program. 1. A calibrated and verified model (*e.g.*, SWMM) of the combined sewer system in a given community should be utilized to determine the storm characteristics that would be likely to result in CSO discharge. Forecasted and observed weather data would be used to determine when such storms are likely to occur or are occurring. a. The above model would be used to identify "critical" CSO outfalls. b. The "critical" outfalls would be monitored for three to five storms of variable intensity per year to test the predictions of the model and performance of the CSO or CSO abatement facility. 2. A system would be established to monitor, on a rotating basis, "non-critical" outfalls. 3. Routine monitoring of all outfalls would be conducted to ensure the elimination of dry-weather discharges (which are illegal). 4. The results of this monitoring would be used to recalibrate the model, if necessary.	EPA, RIDEM, MADEP	[See EPA Region I and RIDEM "Preliminary Agreements," Section 715-05-06.]
I.F.	Authorities responsible for CSOs should be required to maximize CSO discharge flows under their jurisdiction to WWTFs, so as to take maximum advantage of the primary and secondary treatment capacity of the WWTF.	CSO authorities	

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: COMBINED SEWER OVERFLOWS

CODE	POLICY	AGENCIES	STATUS
I.G.	WWTFs should make maximum possible use of existing primary and secondary treatment capacity available for treatment of CSO flows. CSO flows, once brought into a WWTF for treatment, should be subject to requirements of the Clean Water Act (CWA). 1. In cases where secondary treatment capacity is limited, however, consideration should be made to allow flexibility in implementing CWA secondary treatment requirements for the combined flow, in order to allow for maximum use of existing capacity without harming the integrity of the WWTF structure or treatment processes. 2. Secondary capacity of WWTFs should not be increased exclusively for the purpose of treating all wet weather flows at the WWTF.	WWTFs	
II.	CSO Abatement Technologies		
II.A.	Proposed CSO abatement measures should be evaluated based on their ability to achieve the goal of meeting water quality standards and preserving and restoring historic uses, in addition to their compliance with existing state and federal requirements. Secondary benefits of alternative measures, such as providing the greatest possible treatment of the stormwater portion of combined flows, should also be considered.	EPA, RIDEM, MADEP, CSO authorities	
II.B.	The need for disinfection of CSO flows should be evaluated based upon the expected ability to meet the desired goal of preserving and restoring historic uses such as shellfish harvesting balanced against potential treatment or chlorine toxicity problems.	EPA, RIDEM, MADEP, CSO authorities	See 04-02-04 Resource Protection: Public Health

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: COMBINED SEWER OVERFLOWS

CODE	POLICY	AGENCIES	STATUS
III.	Financing and Implementation		
III.A. ✓	**The State of Rhode Island and Commonwealth of Massachusetts should develop statewide priority rankings to help determine how state funds should be spent on CSO abatement projects.** **1. The Rhode Island prioritization schedule should be jointly prepared by NBP and RIDEM staff.** **2. Massachusetts should develop a prioritization schedule which recognizes the importance of and places a high priority on CSO abatement measures for the portion of the Commonwealth within the Narragansett Bay watershed (*i.e.*, Fall River).** **3. These rankings should be used in conjunction with internal priorities established by individual communities and WWTFs.** **4. The rankings are not to prevent any currently planned and funded projects from proceeding.** **5. Factors to be considered in developing the prioritization schedule include pre- and post-abatement values of:** **a. Volume of CSO discharge.** **b. Pollutant loading of CSO discharge.** **c. Water quality impacts of CSO discharge, including probable impacts on existing and desired uses of receiving waters.** **d. Frequency of CSO discharge.** **e. Readiness to proceed with CSO abatement.** **f. Cost of and benefits from CSO abatement.**	**RIDEM, Narragansett Bay Planning Section, NBC, MADEP**	**CSO abatement is required under federal and state laws regulations, and/or policies. [See RIDEM "Preliminary Agreement," Section 715-05-06 re: development of a priority ranking system.]**
III.B.	All sources of funding should be considered for the financing of CSO abatement projects, including reauthorization of the Clean Water Act, federal and state grants, the State Revolving Fund, and local sources.	EPA, State of R.I., Comm. of Mass., municipalities	

✓ - **High Priority Action**

RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: COMBINED SEWER OVERFLOWS

CODE	POLICY	AGENCIES	STATUS
IV.	Sewer Connection Issues		
IV.A.	Sewer authorities with combined sewers should implement a policy that: 1. Allows "no net increase" of stormwater flows to combined sewers as a result of new construction. Potential stormwater increases should be mitigated by on-site measures (*e.g.*, detention basins). 2. Requires new sanitary connections to tie in to separate sanitary sewers whenever technically and economically feasible. 3. Encourages cross-jurisdictional sanitary connections to separate sanitary sewers whenever feasible and necessary to avoid connection to combined sewers. 4. Requires a two-for-one reduction in infiltration/inflow (I/I) for any new sanitary connections to the system. An I/I analysis should be performed prior to requiring the reductions to determine if I/I is a significant contributor to influent flows. The sewer authority would have the responsibility for ensuring the reduction, and the option of whether to pass the responsibility on to the developer. 5. A moratorium on new sanitary connections to combined sewers should <u>not</u> be considered, since such a policy would tend to direct development away from areas having existing infrastructure to areas requiring the construction of new infrastructure.	R.I. and Mass. sewer authorities	
IV.B.	Storm drains that discharge sanitary waste due to illegal connections, effectively operating as combined sewers, should <u>not</u> be regulated in the same manner as CSOs. Sanitary connections to storm drains are illegal and must be eliminated.	EPA, RIDEM, MADEP, municipalities	

✓ - High Priority Action

Estimated Cost of Implementation—
Source Control: Combined Sewer Overflows

Table 715-04(4) summarizes the estimated costs associated with implementing the recommendations in this chapter. Element I (Abatement Policies) contains recommendations that require agencies to review CSO policies, coordinate activities, and to monitor the implementation of such policies. The cost of monitoring CSO discharges is included under Long-Term Monitoring (05-02-04) and Source Reduction: Toxics (04-01-01). The substantial costs associated with large-scale CSO abatement projects are reflected in Element III (Finance and Implementation). The majority of these capital costs (approximately 73 percent) are for NBC projects; the remainder go toward CSO abatement projects planned for WWTFs in the Cities of Taunton and Fall River, Massachusetts. Element IV (Sewer Connection) displays the oversight costs that NBC will encounter in implementing policies regarding new connections to combined sewers. This section also recommends that municipalities eliminate illegal sanitary connections to stormdrain systems; this activity has potential for significant costs, however, these cannot be estimated due to the varying type, size, and location of these systems in the many Bay watershed municipalities.

CSO abatement costs will extend beyond the five-year planning period (post-1997 capital cost of $92.8 million) as will the repayment of bonds issued for CSO abatement purposes. NBC will have additional staffing needs over the project life to perform planning and oversight. There will also be minor coordination and review costs for RIDEM and MADEP.

For further details regarding the *CCMP* cost estimation process and funding strategies, refer to the *Narragansett Bay CCMP Cost Estimation and Funding Report* (Apogee Research Inc./NBP, 1992).

Table 715-04(4)

ESTIMATED COST OF IMPLEMENTATION
SOURCE CONTROL: COMBINED SEWER OVERFLOWS

COST ESTIMATES BY ELEMENT	92-93		93-94		94-95		95-96		96-97		Total 92-97	
	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other
I-Abatement Policies	12,500	0	0	0	22,500	0	5,000	0	10,000	0	50,000	0
II-Abatement Technologies	5,000	0	0	0	0	0	0	0	0	0	5,000	0
III-Finance and Implement	35,000	15,090,000	10,000	19,672,000	10,000	103,481,000	10,000	116,462,000	10,000	86,222,250	75,000	340,927,250
IV-Sewer Connection Issues	50,000	0	50,000	0	50,000	0	50,000	0	50,000	0	250,000	0
TOTALS	102,500	15,090,000	60,000	19,672,000	82,500	103,481,000	65,000	116,462,000	70,000	86,222,250	380,000	340,927,250
TOTAL BY YEAR		15,192,500		19,732,000		103,563,500		116,527,000		86,292,250		341,307,250

COST ESTIMATES BY AGENCY	92-93		93-94		94-95		95-96		96-97		Total 92-97	
	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other
RIDEM	22,500	0	5,000	0	22,500	0	10,000	0	15,000	0	75,000	0
MADEP	15,000	0	5,000	0	10,000	0	5,000	0	5,000	0	40,000	0
NBC	55,000	13,104,000	50,000	17,686,000	50,000	70,313,000	50,000	83,294,000	50,000	63,753,250	255,000	248,150,250
Fall River WWTF	5,000	1,956,000	0	1,956,000	0	31,835,000	0	31,835,000	0	21,135,000	5,000	88,717,000
Taunton WWTF	5,000	30,000	0	30,000	0	1,333,000	0	1,333,000	0	1,334,000	5,000	4,060,000
Municipalities*	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	102,500	15,090,000	60,000	19,672,000	82,500	103,481,000	65,000	116,462,000	70,000	86,222,250	380,000	340,927,250
TOTAL BY YEAR		15,192,500		19,732,000		103,563,500		116,527,000		86,292,250		341,307,250

* Ultimate implementation costs will vary for each municipality depending on its particular environmental and institutional conditions. In addition, the estimated municipal implementation costs do not include ultimate program and capital costs that may result from completion of underlying planning activities, or costs that are expected to be completely recoverable from user fees.

04-01-05 Source Control: On-Site Sewage Disposal Systems

Objective for Management of On-Site Sewage Disposal Systems

The State of Rhode Island, the Commonwealth of Massachusetts, and their municipal governments should undertake initiatives to mitigate and prevent contamination of Narragansett Bay and tributary waters from on-site sewage disposal system wastes in order to minimize public health risks, environmental degradation and impairment of water quality-dependent uses.

Introduction

On-site sewage disposal systems, or OSDS, are an important source of surface and groundwater contamination in the Narragansett Bay basin. Septic systems that are located in poorly drained soils, or which are poorly designed, constructed, or maintained can fail because the assimilative or "treatment" capacity of the soil is exceeded (Zingarelli and Karp, 1991:16; RIDOA, 1987). Similarly, OSDSs fail to provide effective treatment where the cumulative density of development causes hydraulic overload of OSDS leach fields, and where property owners have constructed (illegal) sub-surface drains from the leach field. However, properly designed and completely functional septic systems can also represent a source of viruses, nutrients, and toxic chemicals to receiving waters (Karp *et al.*, 1990:32-34 ; Penniman *et al.* 1991b:33-39; Zingarelli and Karp, 1991:16).

Statement of the Problem

Thirty-seven percent of Rhode Islanders depend upon OSDSs for treatment of domestic, household wastes, and 12 of Rhode Island's 39 cities and towns are completely unsewered, as are several communities in the Massachusetts portion of the Narragansett Bay watershed (RIDOA, 1989a). In addition, over 70 percent of the Narragansett Bay coastline is unsewered and served by OSDSs (Roman, 1990; Karp *et al.*, 1990:32). The potential for contamination of the Bay from OSDS runoff and leachate is exacerbated by increasing residential and commercial development in unsewered suburban and rural areas of the basin, and the conversion of seasonal homes with OSDSs—many installed prior to modern regulations—to year-round residences (Karp *et al.*, 1990:32-33). Closures of shellfish harvesting grounds in several Narragansett Bay embayments have been at least partially attributed to septic system failures (USDA SCS, 1990:9; RIDEM, 1990a; Karp *et al.*, 1990:33; Zingarelli and Karp, 1991:17).

Septic system location, design, age, maintenance, and use are critical considerations for individual septic systems. In general, OSDSs installed prior to Rhode Island's adoption of septic system regulations in 1969 tend to be the systems that fail. Routine maintenance such as pumping out the septic tank, checking the integrity of the tank and the leach field, conserving water, and avoiding disposal of household and commercial toxic and hazardous wastes would help to improve septic system performance, and extend the life of the leach field. However, individual property owners are often unaware of the need for routine maintenance until the system fails (USDA SCS, 1990).

The OSDS issue is further complicated by problems that stem from properly functioning septic systems. Depending upon soil type, water saturation, and other factors, viruses and dissolved chemical pollutants can migrate long distances down-gradient from properly functioning OSDSs and ultimately leach into surface or groundwaters (Karp *et al.*, 1990:33; Penniman *et al.*, 1991b:38). Therefore, residential and commercial OSDSs sited in aquifer recharge areas represent a potential threat to drinking water supplies, as well as to other surface and groundwater supplies. In addition, the cumulative environmental impact associated with the density of residential and commercial septic systems is not usually considered when new septic systems are approved. As a result, the current regulatory system, which focuses on failed septic systems, only addresses part of the problem.

Existing Policies

In Rhode Island, state agencies oversee the siting, design, construction, and regulation of OSDSs, although local governments have the authority to manage OSDS density and maintenance in their communities. Municipal boards of health exercise these responsibilities in Massachusetts. The federal government does not exercise regulatory jurisdiction over any aspect of OSDS design, siting or density. However, the U.S. Environmental Protection Agency (EPA) has issued draft technical guidance regarding OSDS design and performance standards, and siting criteria in support of the Clean Water Act Section 319 Nonpoint Source Pollution Control Program, and the Section 6217 Coastal Nonpoint Management Program (EPA, 1987a; EPA, 1991a; EPA-NOAA, 1991).

The Rhode Island Department of Environmental Management's (RIDEM) OSDS regulations require new and replaced OSDSs to be installed at least three feet above the seasonal high water table, or five feet above impervious formations, and require a minimum setback of 50 feet from surface waters. However, RIDEM requires a 150-foot setback and a four-foot separation distance from groundwater in the Salt Pond region, and a 200-foot setback in the Scituate Reservoir watershed in order to protect these identified critical areas (RIDEM, 1989b). The Rhode Island Coastal Resources Management Council (CRMC) can require up to 180-foot setbacks between septic systems and surface waters in erosion-prone areas (Karp *et al.*, 1990:33).

Rhode Island has also recognized that existing OSDSs need to be managed to assure proper treatment and disposal of septic system wastes. Pursuant to legislation passed in 1987, Rhode Island cities and towns have broad authority to establish "wastewater management districts" (WWMD) to assure that residential and commercial septic systems are routinely inspected and properly maintained. In addition, RIDEM presently requires publicly-owned wastewater treatment facilities (WWTF) to accept septage generated within their service areas for treatment (Zingarelli and Karp, 1991:18).

Two financial assistance programs have been available in Rhode Island to help property owners repair or replace failed septic systems: the $5-million Sewer and Water Supply Failure Fund and the Rhode Island Aqua Fund. However, the Sewer and Water Supply Failure funds were completely expended in 1990, and Aqua Fund bond funds are not available to assist individual property owners.

In summary, state agencies oversee the siting, design, construction, and regulation of septic systems in Rhode Island, although local governments have the authority to manage septic system density and septage disposal issues in their communities. Municipal boards of health exercise these responsibilities in Massachusetts.

Analysis

As of 1991, over 1,200 acres of Rhode Island's salt ponds, tidal rivers and coastal embayments were permanently or seasonally closed to shellfish harvesting due, in part, to runoff and leachate from septic systems, illegal sewer connections to storm drains, and illegal boater discharges (RIDEM, 1990a; Zingarelli and Karp, 1991:17). Some of these areas also show signs of nutrient enrichment, including increased frequency of algal blooms and low dissolved oxygen concentrations. In addition, shoreline surveys of coastal embayments indicate that some property owners have installed (illegal) subsurface drains in the OSDS leach fields resulting in the direct discharge of septic wastes to receiving waters (Zingarelli and Karp, 1991:17).

An OSDS Task Force convened by RIDEM in 1985 recommended increasing the minimum separation distance from the bottom of the OSDS to the seasonal high water table to four feet, at least in critical resource areas and areas with excessively permeable soils. The Task Force also suggested greater horizontal buffer distances between septic systems and critical surface water and groundwater resources to allow for some additional

incidental treatment in the event of a septic system failure.

However, the recommendations of the Task Force were not completely adopted by the RIDEM and may not be sufficient in any case to protect the public from exposure to bacterial or viral pathogens, or to protect living marine resources from other dissolved pollutants in domestic waste (Penniman *et al.*, 1991b:22-24). For example, based on an EPA septic system siting model that evaluated pollutant transport (EPA, 1987a), Roman (1990) concluded that even if the groundwater separation distance were increased to ten feet or 30 feet, fecal contamination would still be considered "probable" because of the poorly drained soils typical of Rhode Island's coastal zone.

Violations, Remediation, and Enforcement

The Rhode Island Division of Planning (RIDOP) estimates that the overall septic system failure rate is between three and five percent, based upon the number of violations reported to the Rhode Island Department of Health (RIDOH) that are subsequently acted upon by RIDEM because the property owner failed to correct the problem. The scope of the problem may be substantially underestimated, however, since property owners are likely to have failed or failing systems pumped out for aesthetic and sanitary reasons before state regulators intervene. In addition, the results of a property owner survey in the Town of Narragansett suggested that the septic system failure rate could be as high as ten to 15 percent in some communities (Zingarelli and Karp, 1991:17). [Note: In 1989, for example, RIDEM issued 2,462 Letters of Warning and 103 Notices of Violation, and the Rhode Island Aqua Fund Council received applications for grant funding from seven communities representing over 2,000 households with failed or failing septic systems (Karp *et al.*, 1990:33).]

In Massachusetts, where responsibility for OSDS installation resides with each municipality, the adequacy of inspection and enforcement is reported to be uneven from community to community (USDA SCS, 1990:3). Regulation of existing septic systems is also erratic in Rhode Island where OSDS inspection and enforcement depends entirely on RIDEM's ability to investigate reported septic system failures. Although Rhode Island cities and towns have had broad authority to establish WWMDs to manage septic systems since 1987, no districts have been established as of 1992. Reasons cited by municipal officials include lack of guaranteed septage disposal options, lack of start-up capital, and political unwillingness to assess user fees to support the districts (Zingarelli and Karp, 1991:19). Efforts to establish a WWMD in the Town of Narragansett in 1991 were tabled because of public opposition to user fees and concerns about granting access to septic system inspectors.

Sewering Unsewered Areas

Sewering represents a necessary solution in some densely developed areas where chronically failing OSDS contribute to surface or groundwater contamination, or limitations on water quality-dependent uses. However, sewering, without appropriate land use controls, can result in more intensive development, increase impervious surfaces (roads, driveways, roofs, sidewalks, *etc.*,) and compound runoff problems. Many planners and regulators, therefore, view sewering as a last resort, acceptable only in extreme cases where the carrying capacity of the soil has been exceeded due to overdevelopment, and where no reasonable alternative or group of alternatives would work.

Routine OSDS inspection and maintenance, water conservation, replacement of failed and failing septic systems, and the use of denitrifying or other advanced treatment technologies, including artificial wetlands and solar aquatic greenhouses represent some alternatives to sewering. In addition, new technologies are emerging with respect to septage treatment. For example, the Massachusetts Department of Environmental Protection (MADEP) issued regulatory approvals to a solar aquatics-type septage treatment facility in Harwich, MA in 1992. [See 04-01-03 Source Control: Water Management and Wastewater Treatment for a brief description of the experimental solar

aquatics wastewater treatment facility at Narragansett Bay Commission Field's Point in Providence.]

Recommended Policies and Actions and *Estimated Cost of Implementation* are presented in the following pages.

RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

CODE	POLICY	AGENCIES	STATUS
I.	The State of Rhode Island and the Commonwealth of Massachusetts should adopt consistent policies and regulations in the Narragansett Bay watershed to regulate the location, design, construction, and use of on-site sewage disposal systems (OSDS) in order to minimize OSDS-derived pollutant loadings to Narragansett Bay and its tributary waters.		
I.A. ✓	**The Rhode Island Department of Environmental Management (RIDEM), subject to interagency review, shall review the adequacy of existing minimum standards in the *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction, and Maintenance of Individual Sewage Disposal Systems* (1989b) with respect to setbacks from drinking water supplies and identified critical resources, minimum separation distances from groundwater, and OSDS design and performance standards, *and:***	**RIDEM, CRMC, MADEP, MACZM**	**[See RIDEM and CRMC "Preliminary Agreements," Section 715-05-06 re: revision of ISDS regulations.] Mass. expects to release draft Title V regulations for public review in fall 1992.**
I.A.1.	The OSDS setback from identified critical resources, including nutrient-sensitive waterbodies, should be increased to a prescribed minimum distance in order to reduce groundwater transport of OSDS-derived fecal contaminants, dissolved nutrients, and toxic pollutants. [*Note*: Prescriptive OSDS setback distances are recommended as an *interim* measure until criteria and standards for site-specific OSDS density controls are established. See 04-01-02 Source Reduction: Nutrients for a description of approaches used to establish site-specific OSDS density controls; and 04-02-02 Resource Protection: Protection of Critical Areas for discussion of critical resource areas.] In order to implement this recommendation:	RIDEM, MADEP, MACZM	

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RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

CODE	POLICY	AGENCIES	STATUS
I.A.1.a.	The OSDS setback distance should be increased to at least 200 feet in unplatted areas adjacent to critical resources, including nutrient-sensitive waterbodies, unless evidence of no significant water quality or use impairment from additional OSDS loadings to adjacent surface or groundwaters can be demonstrated. [Note: In establishing a prescriptive minimum setback distance, RIDEM should review the effectiveness of the 150 foot setback and four foot groundwater separation distance in the coastal pond area. RIDEM should also review existing information regarding groundwater transport of *bacteria* (Roman, 1990; Weiskel and Heufelder, 1989; EPA, 1987a); *viruses* (Roman, 1990; Reneau *et al.* 1989; EPA, 1987a); *nitrogen* (Valiella and Costa, 1988; Groffman *et al.*, 1991); and *toxic pollutants* (Groffman *et al.*, 1991) in evaluating the need for more protective OSDS setback requirements.]	RIDEM, MADEP, MACZM	
I.A.1.b.	The OSDS setback distance should be increased to a minimum of seventy-five feet, up to the maximum possible distance, for existing lots of record.	RIDEM, MADEP, MACZM	
I.A.1.c.	Cluster development should be strongly encouraged in order to obtain appropriately protective OSDS setbacks from critical resources. Unit density limits should include the area of the setback to the extent possible.	RIDEM, MADEP, MACZM	
I.A.2.	The OSDS requirements of minimum depths to ground water should consider factors to account for flooding and sea level rise over the life of the septic system on lots located in Flood Hazard Areas. [See 04-02-02 Resource Protection: Protection of Critical Areas for further recommendations concerning planning for sea level rise.]	RIDEM, MADEP, MACZM	
I.A.3.	The OSDS regulations should be revised to ensure that water level verification and percolation tests are performed on a lot-by-lot basis, coincident with the location of the individual septic systems after the lots are delineated.	RIDEM, MADEP, MACZM	

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RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

CODE	POLICY	AGENCIES	STATUS
I.A.4.	The OSDS regulations should be revised to include applicability criteria, design and performance standards, and effluent limits for a range of alternative OSDS technologies that may be allowed for use in areas: a. Where dimensions or characteristics of the site preclude the use of conventional on-site sewage disposal systems. b. Identified as "critical resource protection areas," including drinking water supply watersheds, watersheds of nutrient-sensitive waters, and waters where water quality problems already exist (*e.g.*, bacteriological and nutrient-related problems such as shellfishing restrictions, persistent hypoxia, algal blooms, *etc.*). The OSDS regulations, as revised, should explicitly recognize that some "critical resource protection areas" are undevelopable with presently available technologies, and that sewering may be the appropriate technology of last resort in some completely developed areas with water quality problems and/or limitations on water quality-dependent uses attributable to OSDSs. c. Presently platted or developed in ≤ 1/2 acre lot sizes. d. Zoned for ≤ 1/2 acre lots close to "critical resource protection areas," where site characteristics indicate that water quality, ecological, or use impairments of the "critical resource protection area" could occur. e. Where there is evidence of existing water quality, habitat, or use impairments related to septic systems.	RIDEM, MADEP, MACZM	

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RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

CODE	POLICY	AGENCIES	STATUS
I.A.4.f.	Where characteristics of the site indicate that water quality, ecological, or use impairments of ground or surface waters related to septic system use could occur. [RIDEM should refer to the EPA *Design Manual for Onsite Sewage Disposal Systems* (in prep., 1992); guidance developed for the Coastal Zone Management Section 6217 Coastal Nonpoint Pollution Control Program (CNPCP), including *Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (EPA, 1991a) and the Rhode Island Land Management Project's *Management Measures for Onsite Sewage Disposal Systems in Coastal Areas* (draft, Myers, 1991); OSDS regulations from other jurisdictions, including Massachusetts' Title 5 requirements (310 CMR 15), as amended; and recommendations in other chapters of the Narragansett Bay *CCMP* in order to develop specific pollutant loading targets and effluent limits, applicability criteria, and design and performance standards for alternative OSDS technologies.]	RIDEM, MADEP, MACZM	
I.A.5.	The RIDEM and Massachusetts counterparts should consider establishing a special approval for experimental OSDSs in order to encourage the development of more effective OSDS technologies, and develop baseline data on the performance of new technologies. The experimental OSDS permit should be linked to groundwater monitoring requirements, and posting of a performance bond. [In developing the requirements for experimental permits RIDEM and the Massachusetts Department of Environmental Protection (MADEP) should review the Virginia Department of Health's (draft) *Alternative Discharging Sewage Treatment System Regulations for Individual Single Family Dwellings* (1992).]	RIDEM, MADEP, MACZM	
I.A.6.	The OSDS regulations should be revised, as necessary, to identify innovative septage treatment and disposal options such as incineration, "solar aquatics" treatment, composting, and land application, and the revised regulations should be cross-referenced to the RIDEM's *Rules and Regulations Pertaining to the Treatment, Disposal, Utilization and Transportation of Wastewater Treatment Facility Sludge* (1991).	RIDEM, MADEP, MACZM	

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RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

CODE	POLICY	AGENCIES	STATUS
I.B.	The RIDEM and MADEP, in conjunction with the Rhode Island Division of Planning (RIDOP), the Rhode Island Coastal Resources Management Council (CRMC), Massachusetts Coastal Zone Management (MACZM), and local governments (as appropriate), should require minimum two-acre zoning and cluster development in currently unplatted areas adjacent to critical resources, including nutrient-sensitive waters, in order to control OSDS density and reduce OSDS-generated pollutant loads. Alternatively, these agencies should require the use of approved OSDS treatment technology adequate to provide wastewater treatment equivalent to two acre OSDS density, unless evidence of no significant water quality or use impairment from additional OSDS loadings can be demonstrated. [*Note*: The prescriptive OSDS density controls are recommended as an interim measure until criteria and standards for site-specific OSDS density controls are established. See 04-01-02 Source Reduction: Nutrients for a description of approaches used to establish site-specific OSDS density controls.]	RIDEM, RIDOP, CRMC, Mass. counterparts, municipalities	
I.C.	The RIDOP should revise the *Handbook on the Local Comprehensive Plan* (1989b) as necessary, to require revised local comprehensive plans to include: 1. An evaluation of the distribution and performance of OSDSs in the community with respect to existing and projected cumulative impacts on water quality; and 2. Recommendations regarding appropriate land use policies to regulate OSDS densities, sewering, and wastewater treatment facility (WWTF) upgrades to protect surface and groundwater quality.	RIDOP	
I.D.	The State of Rhode Island and the Commonwealth of Massachusetts should require owners of residences and other facilities with OSDSs to keep the following records of system maintenance, to be made available to prospective buyers, realtors, and banks before ownership of the land can be transferred. The required seller disclosure information should include the following information: 1. Installation date and type of OSDS. 2. Certification of OSDS tank structural integrity (visually determined by certified septage pumper/hauler and included as part of pump-out receipt). 3. Frequency of historical pumping, date of most recent pumping, and history of leach field failure.	R.I., Mass.	R.I. Association of Realtors submitted draft legislation in 1992 session requiring use of "seller disclosure" statement, including status of septic systems.

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RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

CODE	POLICY	AGENCIES	STATUS
I.E.	The State of Rhode Island should ban the retail sale and advertisement of acid and organic chemical solvents for use in septic systems. The Commonwealth of Massachusetts should ban the use, sale, and advertisement of such chemicals. The State and Commonwealth should also initiate informational campaigns to inform the public of the risk of environmental damage from these products.	R.I., Mass.	
I.F.	The State of Rhode Island and Commonwealth of Massachusetts should prohibit the installation of garbage disposal systems in residences and businesses served by OSDSs in order to reduce nutrient loadings to the septic system. In addition, the State and the Commonwealth should consider requiring the use of grease traps on commercial and residential properties served by OSDSs in order to improve OSDS performance, and increase the lifetime of the leach field.	R.I., Mass., Building Code Commissions	
I.G.	The RIDEM and the Rhode Island Department of Health (RIDOH) should negotiate an interagency Memorandum of Agreement transferring responsibility for OSDS inspections to RIDEM.	RIDEM, RIDOH	Completed September 1990. RIDOH retains jurisdiction to inspect food establishments.
I.H. ✓	**The State of Rhode Island and the Commonwealth of Massachusetts should develop educational programs for municipal officials and the general public that describe the environmental and financial risks of failing to address OSDS density and maintenance.**	**RIDEM, RIDOP, CRMC, Mass. counterparts**	

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RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

CODE	POLICY	AGENCIES	STATUS
II.	By 1995, all properties served by OSDSs in unsewered areas of Rhode Island and the Narragansett Bay basin should be included within a wastewater management district (WWMD) that provides for routine inspection and maintenance of septic systems and adequate treatment and disposal of septic system wastes.		
II.A.✓	**In order to assure that all properties in the Narragansett Bay basin served by OSDSs are routinely inspected and maintained, the RIDEM and RIDOP should prepare draft legislation for submittal in 1993 that amends R.I.G.L. 45-24.5-1 *et seq.* to require each Rhode Island municipality to establish, or to associate with, an established WWMD by no later than January 1995.** **1. WWMDs established pursuant to Chapter 24.5, as amended, should be administered by regional and municipal WWTFs, other utilities, or municipal governments.** **2. Each WWMD should provide for routine inspection and maintenance of all OSDSs within the WWMD, and adequate treatment of all septic system waste generated within the WWMD.** **3. Comparable legislation should be adopted by the Commonwealth of Massachusetts for application, at least, in the Massachusetts portion of the Narragansett Bay basin.**	**RIDEM, RIDOP, CRMC, WWMDs, Mass. counterparts, municipalities**	**No WWMDs have been established in R.I. as of June 1992. Legislation drafted by NBP in 1991 was not submitted. [See RIDEM "Preliminary Agreement," Section 715-05-06 re: agreement to actively promote establishment of WWMDs.**
II.B.	In order to assure that WWMDs effectively and consistently carry out the responsibilities of the District with respect to septage management, the State of Rhode Island and Commonwealth of Massachusetts should establish appropriate enabling authority and administrative and regulatory controls. To implement this recommendation:		

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RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

CODE	POLICY	AGENCIES	STATUS
II.B.1.	The WWMDs established pursuant to Chapter 24.5, as amended, should be empowered to exercise the following additional "powers and duties" pursuant to Section 4 of R.I.G.L. 45-24.5 [Subsections (a) through (j) of R.I.G.L. 45-24.5-4 as presently written, should continue to be exercised by WWMDs administered by local governments, WWTFs or other utilities.]: a. Require more effective wastewater treatment using septic system technologies approved in RIDEM's *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction, and Maintenance of Individual Sewage Disposal Systems* (1989b), as amended, in areas delineated by the municipality as "critical resource protection areas." b. Establish mandatory water conservation requirements for all property owners served by on-site septic systems within the WWMD. c. Establish and enforce prohibitions on the discharge of regulated toxic chemicals to septic systems covered by the WWMD. d. Establish and enforce standards governing the quality of septage eligible for treatment and disposal at the WWTF. e. Establish and enforce mandatory disclosure and reporting requirements regarding septic system maintenance and performance for all property owners served by the WWMD. f. Certify to RIDEM that WWTF treatment and disposal capacity exists to handle septic system wastes generated by any new or expanded septic system approved by RIDEM within the WWMD's service area. g. Advise RIDEM and appropriate municipal officials whether remedial or enforcement action is necessary based on documented septic system failure, the presence of illegal subsurface drains, or evidence of surface or groundwater contamination related to direct or indirect discharges from septic systems within the WWMD. h. Evaluate the cumulative public health and environmental impacts associated with existing and proposed septic systems within the WWMD's service area. i. Assure that property owners perform required repair or replacement of failed or failing OSDSs by enforcement of a lien on the property in question. j. Establish user fees adequate to assure complete cost recovery for all expenses related to operation of the WWMD, including administration of the WWMD, inspection and maintenance of OSDSs, septage treatment and disposal, compliance and environmental monitoring related to OSDS performance, enforcement, and maintenance of a revolving loan fund for repair/replacement of failed septic systems.	RIDEM, RIDOP, Mass. counter-parts	

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RECOMMENDED POLICIES AND ACTIONS
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CODE	POLICY	AGENCIES	STATUS
II.B.2.	The WWMDs established pursuant to Chapter 24.5, as amended, should be required to exercise the following additional "duties" pursuant to a new section of R.I.G.L. 45-24.5 that explicitly requires all WWMDs to: a. Maintain records of septic system inspection, maintenance, pumping frequency, installation, repair, and replacement in a standardized format that is available for periodic review by RIDEM. b. Notify RIDEM regarding the location of failed or failing on-site sewage disposal system(s) within the WWMD's jurisdiction. c. Notify RIDEM regarding the location of ground or surface waters contaminated directly or indirectly by on-site septage disposal systems within the WWMD. d. Notify RIDEM regarding "critical resource protection areas" delineated by the municipality within the WWMD's jurisdiction that require more effective wastewater treatment, using septic system technologies approved in RIDEM's *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction, and Maintenance of Individual Sewage Disposal Systems* (1989b), as amended.	RIDEM, RIDOP, WWMDs, Mass. counterparts, municipalities	
II.B.3.	The RIDOP shall: a. Review and approve all WWMD ordinances and plans developed pursuant to R.I.G.L. 45-24.5-1 *et seq.* based upon technical guidance developed by RIDOP, RIDEM, and CRMC. [The model ordinance developed by the RIDOP ("*Scituate Reservoir Management Plan: Waste Water Management Districts...A Starting Point*". Report #62, 1987) should be referenced in Section 4 of R.I.G.L. 45-24.5, as amended.] b. Recommend the creation of regional WWMDs using the boundaries proposed in Rhode Island's '208' Areawide Water Quality Plan if the RIDEM determines that completely unsewered municipalities in Rhode Island have not been included within a WWMD by 1995.	RIDOP	

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RECOMMENDED POLICIES AND ACTIONS
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CODE	POLICY	AGENCIES	STATUS
II.C.	In order to provide for adequate treatment and disposal of all septic system wastes generated within the Narragansett Bay basin, the following measures should be taken:		
II.C.1.	A new section should be added to R.I.G.L. 45-24.5 that explicitly requires every municipal WWTF in the State of Rhode Island to provide for adequate treatment and disposal of all septic system wastes generated within the municipality by January 1995. [This recommendation should apply to every WWTF in the State of Rhode Island that is subject to Rhode Island Discharge Elimination System (RIPDES) permitting requirements and eligible to receive federal or state funds.]	RIDEM, RIDOP, Mass counterparts	RIDEM currently requires WWTFs to accept septage generated within their service areas.
II.C.2.	A new section should be added to R.I.G.L. 45-24.5 that explicitly requires regional WWTFs such as the Narragansett Bay Commission (NBC) and the Port Authority facility at Quonset Point to reserve septage treatment and disposal capacity after 1995 for municipalities within the regional WWTF's existing service area; completely unsewered municipalities that are not served by a regional or municipal WWTF; and municipalities that can demonstrate that municipally-generated septage cannot be treated at other WWTFs because of limitations on treatment capacity. a. This requirement shall not be interpreted to relieve other WWTFs or municipalities from the obligation to establish WWMDs as required under R.I.G.L. 45-24.5, as amended. b. In addition, regional and state-operated WWTFs subject to this section, as amended, shall not be required to modify or waive existing criteria governing the acceptance of septage for treatment and disposal, or the rate structure applied to other users of the WWTF in order to satisfy the requirements of the Section, as amended. [The requirement to reserve septage treatment capacity may be waived by the Director of RIDEM if the Department finds that the reserved capacity is unnecessary.]	RIDEM, RIDOP, WWTFs	Port Authority septage receiving facility (17,000 gpd) should go on line in 1992. NBC Field's Pt. facility stopped accepting septage in 1992 because of odor complaints. NBC plans to design septage receiving facility at Field's Pt. within two years. NBC Bucklin Pt. currently accepts septage generated within its service area.

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RECOMMENDED POLICIES AND ACTIONS
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CODE	POLICY	AGENCIES	STATUS
II.C.3.	The RIDEM and the MADEP shall determine what daily volume of septage each WWTF can accept for treatment and disposal without violating its National Pollutant Discharge Elimination System (NPDES)/RIPDES effluent limits; and require every WWTF to adopt numerical septage discharge limits governing the acceptance of septage for treatment and disposal. In addition, the U.S. Environmental Protection Agency (EPA), RIDEM, MADEP and local industrial pretreatment programs shall: a. Evaluate all commercial enterprises that generate septage within the Narragansett Bay watershed for inclusion in industrial pretreatment programs by December 1995. [See 04-01-01 Source Reduction: Toxics for further discussion of the proposed expansion of the pretreatment program.] b. Establish enforceable pretreatment standards for toxic metals and organic chemicals in septage and enforce existing state prohibitions on the discharge of non-domestic waste to OSDSs. c. Develop technical guidance to govern the promulgation of standards and, to the maximum extent practicable, ensure that consistent standards regarding septage quality are adopted and enforced statewide. [These agencies should review chemical criteria developed by the NBC to determine whether septage is acceptable for disposal.] d. Cooperate in developing regional septage disposal options.	EPA, RIDEM, WWTFs, Industrial Pretreatment Programs, municipalities, Mass. counterparts	
II.D.	In order to assure that failed on-site sewage disposal systems are repaired or replaced and that WWMDs are established and financially able to effectively carry out the responsibilities of the District with respect to septage management:	EPA, RIDEM, RICWPFA (SRF), R.I. Aqua Fund, WWTFs, Mass. counterparts	
II.D.1.	The State of Rhode Island should re-authorize the "Sewer and Water Supply Failure Fund" as a revolving loan fund to allow continued repair and replacement of failed individual OSDSs. Loans should be conditioned on the existence of local WWMDs.	State of R.I.	

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RECOMMENDED POLICIES AND ACTIONS
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CODE	POLICY	AGENCIES	STATUS
II.D.2.	The EPA, Rhode Island Clean Water Protection Finance Agency (RICWPFA), Rhode Island Aqua Fund Council and Massachusetts State Revolving Fund Authority (SRF) should provide economic incentives for municipalities to establish WWMDs prior to the 1995 deadline and for municipalities and regional WWTFs to establish regional WWMDs. Such incentives might take the form of reduced interest rates on SRF loans to municipalities or regional WWTFs that: a. have established WWMDs prior to the 1995 deadline; b. have expanded the jurisdiction of the WWMD to include other municipalities; and/or c. are accepting septage from municipalities outside the WWMD.	RIDEM, RICWPFA (SRF), R.I. Aqua Fund, Mass. counterparts	
II.D.3.	Municipal WWMDs should establish user fees sufficient to cover all costs associated with administering and operating the WWMD. a. The municipality may consider establishing an "avoidable surcharge" system whereby a portion of the user fee is waived upon the property owner providing proof of OSDS inspection on an annual basis, and proof that the OSDS has been pumped according to a pre-established schedule. b. The user fee or surcharge should be sufficient to cover the Town's costs in providing substituted inspection and pumping services, encourage voluntary compliance with OSDS maintenance requirements, and all administrative and operating costs of the WWMD.	Municipalities, WWMDs	

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RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

CODE	POLICY	AGENCIES	STATUS
III.	The State of Rhode Island and the Commonwealth of Massachusetts should encourage the use of water conservation and alternative wastewater treatment technologies before extending public sewers in order to avoid increased development in critical or sensitive areas that cannot accommodate additional growth. In order to implement this recommendation, A. The State of Rhode Island and the Commonwealth of Massachusetts should recommend sewering in sensitive areas of the Narragansett Bay watershed *if and only if* the area is "built-out" in terms of pollutant loading or existing zoning, *and* after all reasonable alternatives are explored, including, but not limited to mandatory water conservation and the use of alternative on-site wastewater treatment technologies, such as composting toilets, engineered wetlands or solar aquatic facilities. B. The RIDEM, CRMC, RIDOP, their Massachusetts counterparts, and all local permitting authorities should increase their efforts to educate the public about the need and procedures for maintaining OSDSs. C. The EPA, RIDEM, CRMC, and their Massachusetts counterparts should explore the permitted use of alternative wastewater and septage treatment technologies, such as passive solar aquatic "greenhouses." These agencies should carefully consider whether the proposed alternative technologies have been proven effective and whether the use of these technologies will promote increased development in critical or sensitive areas where the pollutant carrying capacity of the land is exceeded.	EPA, RIDEM, RIDOP, CRMC, Mass. counterparts	[See RIDOP and RIDOH "Preliminary Agreements," Section 715-05-06 re: enforcement of water conservation provisions of R.I.G.L. 46-15.4. MADEP issued regulatory approvals to solar aquatics septage treatment facility in Harwich, Mass. in June 1992.

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Estimated Cost of Implementation—Source Control:On-Site Sewage Disposal Systems

Table 715-04(5) summarizes the estimated costs associated with implementing the recommendations in this chapter. The major cost in Element I (Policies and Regulations) is the recommended evaluation of the effectiveness of existing OSDS density controls based upon nitrogen loading ($127,500). Activities included in this are the development of nutrient and runoff loading models and providing training to state and local officials. The delineation of nutrient-sensitive waters is costed under 04-02-02 Resource Protection: Protection of Critical Areas. There are lesser costs associated with the revision of regulations, interagency coordination, and legislative costs.

Element II (Wastewater Management Districts) contains the largest cost in this table, a $5,000,000 reauthorization of the Rhode Island Sewer and Water Supply Failure Fund. There are also costs pertaining to review of WWMD ordinances, agency guidance, and legislative actions. The major costs associated with Element II are for municipalities to establish WWMDs, although all administrative and operating costs are expected to be recovered from user fees. The establishment of WWMDs would create an additional annual cost for OSDS owners which would be offset by the fact that WWMD fees include the cost of septic system pumping (average pumping cost is $100). An indication of the cost of implementing a WWMD appears in an application to the Rhode Island Aqua Fund by the Town of Narragansett (June 1991). The Town requested funding in the amount of $143,140 for staff costs, public education, mapping and inventory of OSDSs, seed money for a revolving loan fund ($75,000), consultant services, and office supplies and equipment. An additional $14,160 would be derived from a first year user charge of approximately $2.80 per OSDS owner (based on 5,075 systems townwide). Total first year costs are estimated to be $157,300. In the second year, an average annual fee of $50.58 would be initiated and charged to each OSDS owner. The $256,000 derived from this annual charge would fully fund the operation of the WWMD. Also included in this section is a recommendation that the state provide economic incentives to WWTFs to establish WWMDs; the cost of providing these incentives cannot be estimated until specific incentives are selected.

The personnel costs for the recommendations in this chapter are distributed mainly between RIDEM and MADEP, with lesser legislative costs going to the Rhode Island and Massachusetts Legislatures and local governments. For further details regarding the *CCMP* cost estimation process and funding strategies, refer to the *Narragansett Bay CCMP Cost Estimation and Funding Report* (Apogee Research Inc./NBP, 1992).

Table 715-04(5)

ESTIMATED COST OF IMPLEMENTATION
SOURCE CONTROL: ON-SITE SEWAGE DISPOSAL SYSTEMS

COST ESTIMATES BY ELEMENT	92-93		93-94		94-95		95-96		96-97		Total 92-97	
	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other
I-Policies and Regulations	67,500	0	0	0	50,000	0	50,000	0	57,500	0	225,000	0
II-Wastewater Mgt. Districts	66,250	5,000,000	0	0	75,000	0	30,000	0	30,000	0	201,250	5,000,000
III-Alternative Technologies	5,000	0	5,000	0	5,000	0	5,000	0	5,000	0	25,000	0
TOTALS	138,750	5,000,000	5,000	0	130,000	0	85,000	0	92,500	0	451,250	5,000,000
TOTAL BY YEAR		5,138,750		5,000		130,000		85,000		92,500		5,451,250

COST ESTIMATES BY AGENCY	92-93		93-94		94-95		95-96		96-97		Total 92-97	
	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other
RIDEM	66,250	5,000,000	0	0	30,000	0	25,000	0	25,000	0	146,250	5,000,000
RI CRMC	0	0	0	0	30,000	0	25,000	0	25,000	0	80,000	0
RIDOP	1,250	0	0	0	30,000	0	5,000	0	5,000	0	41,250	0
RI Legisature	12,500	0	0	0	12,500	0	0	0	0	0	25,000	0
MADEP	43,750	0	5,000	0	10,000	0	5,000	0	5,000	0	68,750	0
MACZM	0	0	0	0	5,000	0	25,000	0	25,000	0	55,000	0
MA Legislature	15,000	0	0	0	12,500	0	0	0	0	0	27,500	0
Municipalities*	0	0	0	0	0	0	0	0	7,500	0	7,500	0
TOTALS	138,750	5,000,000	5,000	0	130,000	0	85,000	0	92,500	0	451,250	5,000,000
TOTAL BY YEAR		5,138,750		5,000		130,000		85,000		92,500		5,451,250

* Ultimate implementation costs will vary for each municipality depending on its particular environmental and institutional conditions. In addition, the estimated municipal implementation costs do not include ultimate program and capital costs that may result from completion of underlying planning activities, or costs that are expected to be completely recoverable from user fees.